



Chapter Three

AVIATION FACILITY REQUIREMENTS



FACILITY REQUIREMENTS

To properly plan for the future of Sierra Vista Municipal Airport, it is necessary to translate forecast aviation demand into the specific types and quantities of facilities that can serve this demand. This chapter uses the results of the forecasts conducted in Chapter Two, as well as established planning criteria, to determine the airfield (i.e., runways, taxiways, navigational aids, marking and lighting), and landside (i.e., hangars, terminal building, aircraft parking apron) facility requirements.

Having established these facility requirements, alternatives for providing these facilities will be evaluated in Chapter Four to determine the most cost-effective and efficient means for implementation.

Recognizing that the need to develop facilities is determined by demand, rather than a point in time, the requirements for new facilities have been expressed for the short, intermediate,



and long term planning horizons, which roughly correlate to five-year, ten-year, and twenty-year time frames. Future facility needs will be related to these activity levels rather than a specific year. **Table 3A** summarizes the activity levels, as determined in Chapter 2, that define the planning horizons used in the remainder of this master plan.

AIRFIELD REQUIREMENTS

Airfield requirements include the need for those facilities related to the arrival and departure of aircraft. These facilities are comprised of the following items:



- Runways;
- Taxiways;
- Navigational Aids; and
- Airfield Marking and Lighting.

The following airfield facilities are described in terms of requirements to accommodate the airport's civilian role throughout the planning period.

TABLE 3A Aviation Demand Planning Horizons Sierra Vista Municipal Airport				
	2000	Short Term	Intermediate Term	Long Term
ENPLANEMENTS	7,895	15,500	19,800	24,900
OPERATIONS				
Airline/Air Taxi	3,361	4,260	5,040	6,360
Local (Military/GA)	49,500	53,600	57,500	66,800
Itinerant (Military/GA)	16,757	19,800	22,700	29,400
Total Operations	69,618	77,660	85,240	102,560
BASED AIRCRAFT	54	72	93	142

AIRFIELD DESIGN STANDARDS

Due to the fact that Sierra Vista/Libby Army Airfield is a joint use facility there are two sets of concurrent standards which must be recognized and consulted when proposing any airside facility requirement. The landside facilities are sited on property owned by the city and adhere to FAA standards.

The selection of appropriate FAA design standards for the development and location of airport facilities is based primarily upon the characteristics of the civilian aircraft which are currently using, or are expected to use, the airport. Similar planning is conducted for military needs by the Army and briefly discussed here. Planning for future aircraft use is of particular importance since design standards are used to plan separation distances between facilities. These standards

must be determined now since the relocation of these facilities will likely be extremely expensive at a later date.

The military standards are referenced in Army Technical Manual TM 5-803-7, *Airfield and Heliport Planning and Design* revised May 1, 1999. The Army classifies runways in two major categories, either A or B, according to aircraft type and their requirements. Each category has its own standards for specific design elements, such as runway lengths and widths, Accident Potential Zones (APZ), and shoulder widths.

For example, the width for Class A Army runways is 100 feet. The runway length is determined by the aircraft using the field, but is typically less than 8,000 feet. Class A runways are designed for smaller, light aircraft and are not intended to be developed for future use as Class B facilities.

Class B runways are designed for large, heavy aircraft and high performance aircraft. Class B runways must be 150 feet in width, with the length determined by the performance standards of the most critical aircraft. Runway 8-26 at Sierra Vista is the only Class B runway. Runways 12-30 and 3-21 meet Class A standards.

The FAA has established a coding system to relate airport design criteria to the operational and physical characteristics of aircraft expected to use the airport. This code, the **Airport Reference Code (ARC)**, has two components. The first component, depicted by a letter, is the **aircraft approach category** and relates to aircraft approach speed (operational characteristic). The second component, depicted by a Roman numeral, is the **airplane design group** and relates to aircraft wingspan (physical characteristic). Generally, aircraft approach speed applies to runways and runway-related facilities, while airplane wingspan primarily relates to separation criteria involving taxiways, taxilanes, and landside facilities.

According to FAA Advisory Circular (AC) 150/5300-13, *Airport Design*, an aircraft's approach category is based upon 1.3 times its stall speed in landing configuration at that aircraft's maximum certificated weight. The five approach categories used in airport planning are as follows:

Category A: Speed less than 91 knots.

Category B: Speed 91 knots or more, but less than 121 knots.

Category C: Speed 121 knots or more, but less than 141 knots.

Category D: Speed 141 knots or more, but less than 166 knots.

Category E: Speed greater than 166 knots.

The airplane design group (ADG) is based upon the aircraft's wingspan. The six ADG's used in airport planning are as follows:

Group I: Up to but not including 49 feet.

Group II: 49 feet up to but not including 79 feet.

Group III: 79 feet up to but not including 118 feet.

Group IV: 118 feet up to but not including 171 feet.

Group V: 171 feet up to but not including 214 feet.

Group VI: 214 feet or greater.

In order to determine facility requirements, an ARC should first be determined, then appropriate airport design criteria can be applied. This begins with a review of the type of aircraft using and expected to use Sierra Vista Municipal Airport/Libby Army Airfield.

Military Use

As stated in Chapter 2 discussions with advisory personnel with Libby Army Airfield and Fort Huachuca identified the type of military aircraft using the airport. A wide variety of military aircraft use the airport on a regular basis and range from helicopters such as the Bell UH-1 Iroquois to fighter aircraft such as the General Dynamics F-16 Fighting Falcon, the Fairchild Republic A-10 Thunderbolt, and large

transport aircraft such as the Lockheed C-130 Hercules. Demand is also shared by several Beechcraft King Air (military C-12's) which also operate from the military side of the airport. Requirements of the most critical of these aircraft are to be served by Class B runways per the Airfield and Heliport Planning Criteria Manual, TM 5-803-7. The length of Runway 8-26 has been determined by the critical aircraft Lockheed C-141A and B series Starlifter, according to Libby Army Airfield sources.

Civilian Use

Civilian general aviation use of the airport includes a variety of aircraft and ARC design groups. Small single and multi-engine aircraft fall within approach categories A and B and airplane design group I. Business turboprop, jet aircraft and regional air carrier turbo prop aircraft fall within approach categories B and C and airplane design groups II and III. The U.S. Forest Service bases Lockheed C-100-30 Hercules (C-130) at the airfield during fire season. Although currently based on the military side, air operations are considered civilian general aviation operations. Accordingly, fuel is purchased on the civilian side. The C-130 falls within approach category C and design group IV, achieving the highest ARC designation of all civilian aircraft at Sierra Vista: ARC C-IV.

Civilian air passenger service is served by the Beech 1900 with an ARC B-II. If replacement of the Beech 1900's is

anticipated, the DeHavilland Dash 8, with an ARC rating of A-III, or similar turbo propeller aircraft, is a likely successor. Passenger service is forecast to be provided by these aircraft for the short and intermediate terms as indicated in the Commercial Fleet Forecast. The intermediate and long term future civilian fleet mix forecast also includes regional jet aircraft providing air passenger service. Typical regional jet aircraft and business jets fall within ARC C-II and D-II. **Table 3A, Representative General Aviation Aircraft by ARC** projects the typical aircraft that can be expected within a particular ARC.

Considering the existing and future combined general aviation and air service civilian fleet mix at Sierra Vista Municipal Airport/Libby Army Airfield, the airfield approach category for the design elements would require approach category D design standards.

The design of taxiway and apron areas should consider the wingspan requirements of the most demanding aircraft to operate within that specific functional area on the airport. This function relates to the Aircraft Design Group (ADG). The terminal area at Sierra Vista would be required to adhere to ADG III requirements to accommodate the Dash 8 aircraft. Future air cargo and aircraft conversion facilities, including or facilities supporting the U.S. Forest Service aircraft, will require adherence to ADG IV design standards. It is determined that ADG IV is the highest design category to be accommodated with civilian facilities.

TABLE 3B Representative General Aviation Aircraft by ARC				
Airport Reference Code	Typical Aircraft	Approach Speed	Wingspan (feet)	Maximum Takeoff Weight (lbs)
	Single Engine Piston			
A-I	Cessna 150	55	32.7	1,600
A-I	Cessna 172	64	35.8	2,300
A-I	Beechcraft Bonanza	75	37.8	3,850
	Turboprop			
A-II	Cessna Caravan	70	52.1	8,000
	Multi Engine Piston			
B-1	Beechcraft Baron	96	37.8	5,500
B-1	Piper Navajo	100	40.7	6,200
B-1	Cessna 421	96	41.7	7,450
	Turboprop			
B-1	Mitsubishi MU-2	119	39.2	10,800
B-1	Piper Cheyenne	119	47.7	12,050
B-1	Beechcraft King-Air B-100	111	45.8	11,800
	Business Jets			
B-1	Cessna Citation I	108	47.1	11,850
B-1	Falcon 10	104	42.9	18,740
	Turboprop			
B-II	Beechcraft Super King Air	103	54.5	12,500
B-II	Cessna 441	100	49.3	9,925
	Business Jets			
B-II	Cessna Citation II	108	51.7	13,330
B-II	Cessna Citation III	114	53.5	22,000
B-II	Cessna Citation Bravo	114	52.2	15,000
B-II	Cessna Citation Excel	114	55.7	19,400
B-II	Cessna Citation Ultra	109	52.2	16,500
B-II	Falcon 20	107	53.5	28,660
B-II	Falcon 900	100	63.4	45,500
	Business Jets			
C-1	Lear 55	128	43.7	21,500
C-1	Rockwell 980	137	44.5	23,300
C-1	Lear 25	137	35.6	15,000
	Turboprop			
C-II	Rockwell 980	121	52.1	10,325
	Business Jets			
C-II	Canadair Challenger	125	61.8	41,250
C-II	Gulfstream III	136	77.8	68,700
	Business Jets			
D-I	Lear 35	143	39.5	18,300
D-II	Gulfstream II	141	68.8	65,300
D-II	Gulfstream IV	145	78.8	71,780

For planning purposes existing standards should be maintained for the foreseeable future to accommodate military needs. This design ARC is the equivalent of E-V, allowing aircraft with approach speeds greater than 166 knots and wingspans from 171 to 214 feet in length. All civilian airside facilities should be designed to accommodate ARC D-IV.

RUNWAYS

The adequacy of the existing runway system at Sierra Vista Municipal Airport/Libby Army Airfield has been analyzed from a number of perspectives, including airfield capacity, runway orientation, runway length, and pavement strength. From this information, requirements for runway improvements have been determined for the airport.

Airfield Capacity

An airport's airfield capacity is expressed in terms of its annual service volume. Annual service volume is a reasonable estimate of the maximum level of aircraft operations that can be accommodated in a year. The capacity of the airfield is affected by several factors including airfield layout, meteorological conditions, aircraft mix, runway use, aircraft arrivals, aircraft touch-and-go activity, and exit taxiway locations.

Many of the conditions at Sierra Vista Municipal Airport serve to maximize airfield capacity. The existing airfield layout, which includes a 12,000 foot

runway and two crosswind runways, allows high capacity use. The limited number of days each year that visibility or cloud ceilings are reduced adds to this capacity. An increased number of available exit taxiways reduces runway occupancy times, which increases airfield capacity as well.

Despite the existing runway configuration, which provides for near maximum airfield capacity, the aircraft mix, which includes a majority of large aircraft, is the greatest limiting factor to airfield capacity. This mix requires increased separation standards per recent FAA safety standards upgrades.

Pursuant to FAA guidelines detailed in FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*, the existing and future annual service volume for Sierra Vista Municipal Airport has been analyzed. The results of this analysis are summarized in **Table 3C**, Annual Service Volume Summary. The existing annual operations are estimated at approximately 70,000 operations. The annual service volume for the airfield, as determined by the FAA guideline, *FAA Order 5090.3B, Field Formulation of the National Plan of Integrated Airport Systems*, is 225,000 operations. This is projected to decrease in the intermediate to long term planning period to 215,000 as the mix changes to include a larger percentage of general aviation and regional air carrier aircraft.

FAA Order 5090.3B indicates that improvements for airfield capacity should be considered when operations reach 60 percent of the annual service volume. Presently, airfield operations

represent approximately 31 percent of the airport's annual service volume and are forecast to remain below 60 percent throughout the planning period. There-

fore, airfield capacity improvements are not expected to be required during the planning period.

TABLE 3C			
Annual Service Volume Summary			
	Annual Operations	Annual Service Volume	Percent Capacity
Existing (1999)	69,618	225,000	30.9%
Short Term	77,660	225,000	34.5%
Intermediate Term	85,240	215,000	39.6%
Long Term	102,560	215,000	47.7%

Runway Orientation

The airport is presently served by Runway 8-26, oriented in an east-west direction, Runway 3-21, oriented in a northeast-southwest direction, and Runway 12-30, oriented in a northwest-southeast direction. For the operational safety and efficiency of an airport, it is desirable for the principal runway of an airport's runway system to be oriented as closely as possible to the direction of the prevailing wind. This reduces the impact of wind components perpendicular to the direction of travel of an aircraft that is landing or taking off (defined as a crosswind).

FAA design standards recommend additional runways when the primary runway alignment provides less than 95 percent wind coverage at specific crosswind components. The 95 percent wind coverage is computed on the basis of crosswinds not exceeding 10.5 knots for small aircraft weighing less than 12,500 pounds and from 13 to 20 knots for aircraft weighing over 12,500 pounds. The most current ten years of wind data specific to Sierra Vista

Municipal Airport has been examined and is summarized in **Exhibit 3A, Wind Rose**. As shown each runway orientation provides 95 percent wind coverage or above for all crosswind components and weather conditions. The combined coverage of all runways exceeds 99.80 percent wind coverage. Therefore, no additional runway orientations are needed to achieve minimum wind coverage at Sierra Vista Municipal Airport.

Runway Length

The determination of runway length requirements for an airport are based on five primary factors: airport elevation; mean maximum temperature of the hottest month; runway gradient (difference in elevation of each runway end); critical aircraft type expected to use the airport, and stage length of the longest nonstop trip destinations.

Aircraft performance declines as each of these factors increase. For Sierra Vista Municipal Airport summertime temperatures, elevation, and the use of

high performance aircraft and large heavy payload transport aircraft are the greatest factors in determining runway length requirements.

The following critical figures will be considered in calculations to determine runway length using FAA Design software. The airport elevation at Sierra Vista Municipal Airport, is 4,716 feet above mean sea level (MSL). The mean maximum temperature of the hottest month is 93 degrees Fahrenheit. Runway 3-21 has an effective gradient of 2.1 percent rising up to the southwest, Runway 8-26 1.00 percent up to the west, and Runway 12-30 has an effective gradient of less than 1.00 percent.

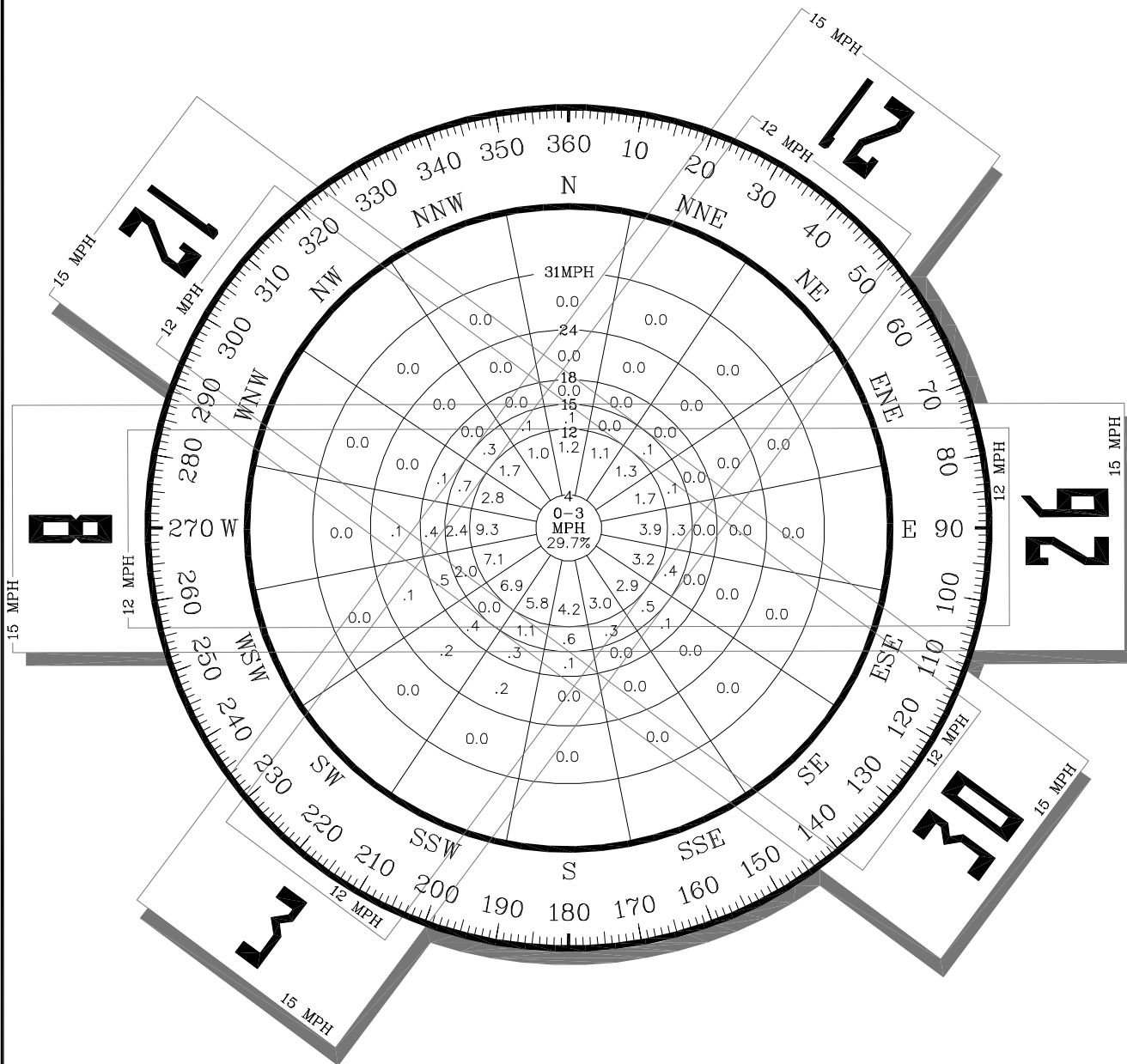
Although the airfield is not currently utilized to a great extent for civilian air cargo operations, there is active interest in basing an aircraft conversion operation on the civilian side. The Boeing 747 aircraft has been mentioned

particularly for conversion operations. **Table 3D** summarizes runway length requirements for common aircraft used by cargo airlines. In calculating the runway requirements for these aircraft, maximum loading (payload and fuel) has been assumed. As shown, runway length requirements can reach as high as 12,500 feet for a fully-loaded MD-11. At its present length of 12,000 feet, Runway 8-26 can accommodate most of the full range of commercial cargo aircraft, including the 747, at maximum loading conditions, during the warm summer months. As aircraft arriving for conversion or departing after conversion are generally not fully loaded, the aircraft will require substantially less runway length than that outlined in **Table 3D** and additional runway length would not be needed. Therefore, additional runway length is not needed for future air cargo operations at Sierra Vista Municipal Airport.

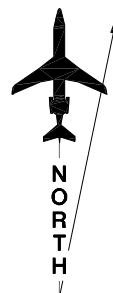
TABLE 3D Common Cargo Aircraft Runway Length Requirements	
Aircraft	Runway Length in feet at max. load
McDonnell-Douglas DC-9-30	9,600
Boeing 727-200	11,900
Boeing 757-200	7,900
McDonnell-Douglas DC-8-63F	10,600
Boeing 767-300 ER	10,300
McDonnell-Douglas DC-10-10	12,400
McDonnell-Douglas MD-11	12,500
Boeing 747-400F	11,800
Source: FAA Advisory Circular 5325-4A, Runway Length Requirements for Airport Design, Aircraft Characteristics for Airport Planning (Boeing, McDonnell-Douglas)	

Length requirements for the remaining portion of civil aircraft which may use the airport are summarized in **Table**

3E and have been examined using FAA Airport Design Software (Version 4.2D) which provides runway length



SOURCE:
 USAFETAC
 Air Weather Service
 Military Airlift Command
 Global Climatology Branch
 87,602 Observations
 January 1961 to December 1981



WIND DATA		
RUNWAY	12 MPH	15 MPH
8-26	95.78%	96.68%
3-21	96.45%	N/A
12-30	96.28%	98.92%
Combined Coverage	99.80%	99.90%

Magnetic Variance
 N 11° 31' 38" E (December 2000)
Annual Rate of Change
 18.77' West (December 2000)



requirements for various groupings of aircraft with similar requirements. The appropriate category for the majority of general aviation aircraft is “small airplanes with 10 or more passenger seats”. For this category, the program specifies a runway length of 6,190 feet. Runway 8-26, which serves both civilian and military operations at the airport, exceeds this length requirement. Neither Runway 3-21 which is 4,300

feet, nor Runway 12-30 which is 5,365 feet, meets this standard. The appropriate planning category for the full range of business aircraft which use the airport is “100 percent of large airplanes at 60 percent useful load (payload and fuel)”. For this category, the design program specifies a runway length of 10,870 feet. Again Runway 8-26 provides sufficient length to meet this requirement.

TABLE 3E
Runway Lengths Recommended For Airport Design

Small airplanes with approach speeds of less than 30 knots	440 feet
Small airplanes with approach speeds of less than 50 knots	1180 feet
Small airplanes with less than 10 passenger seats	
75 percent of these small airplanes	4,500 feet
95 percent of these small airplanes	5,960 feet
100 percent of these small airplanes	6,190 feet
Small airplanes with 10 or more passengers seats	6,190 feet
Large airplanes of 60,000 pounds or less	
75 percent of these large airplanes at 60 percent useful load	6,690 feet
100 percent of these large airplanes at 60 percent useful load	10,870 feet

Source: FAA Design Software Version 4.2D

Runway Width

The width of Runway 8-26 is 150 feet and adequate for aircraft through ADG V and Class B military aircraft. Runway 12-30 is 100 feet and can accommodate aircraft through ADG III and Class A military aircraft. Runway 3-21 accommodates ADG I and II and Class A military aircraft. No additional runway width is required to serve civilian aircraft expected to operate at Sierra Vista Municipal Airport through the planning period.

Runway Pavement Strength

The most important feature of airfield pavement is its ability to withstand repeated use by aircraft of significant weight. At Sierra Vista Airport/Libby Army Airfield, this includes a wide range of military and civilian aircraft. According to military officials Runway 8-26 has been designed to support 75,000 annual operations by a Lockheed C-141 Starlifter aircraft whose weight is 325,000 pounds. The current strength ratings for each

runway have been summarized in **Table 3F**. These pavement strength ratings are sufficient for the civilian aircraft currently serving and expected to serve the airport through the

planning period. However, runway strength should be determined for Runway 3-21, for future needs determination.

TABLE 3F			
Pavement Strength Ratings (pounds)			
	Runway 3-21*	Runway 8-26	Runway 12-30
Single Wheel Loading (SWL)	-	75,000	46,000
Dual Wheel Loading (DWL)	-	150,000	106,000
Dual-Tandem Wheel Loading (DTWL)	-	300,000	137,000
Double Dual-Tandem Wheel Loading (DDTWL)	-	640,000	172,000
* Strength rating has not been determined for this runway.			

TAXIWAYS

Taxiways are constructed primarily to facilitate aircraft movements to and from the runway system. Some taxiways are necessary simply to provide access between the aprons and runways, whereas other taxiways become necessary to provide safe and efficient use of the airfield as aircraft traffic increases.

Presently, access to civilian portions of the airfield is provided by Taxiways D, G, J, and K. Taxiway G connects the end of 26 to the general aviation area on the east side of the civilian portion of the airfield. Taxiway G, then, continues at a right angle to parallel Runway 8-26 for approximately 1500 feet. At this point the taxiway continues as Taxiway K as it angles to parallel Runway 12-30 and accesses the runup area and end of Runways 21 and 12. Taxiway D1 provides access from the civilian side to the military facilities, crossing both Runways 12-30 and 8-26. Taxiway D extension will be the main taxiway that

provides access to the 203 acres, proposed for acquisition. Taxiway J provides exit and entry to Runway 12-30.

The joint use taxiways are the Main Taxiway and Taxiways A, B, C1, F, and the Southeast Taxiway. The Main Taxiway is the parallel taxiway for Runway 8-26. This runs 12,000 linear feet on the south side of the runway on the military side of the airfield. Taxiways A and B are connecting taxiways to the Main Taxiway. Taxiway C1 connects the end of Runway 3 to the Main Taxiway. Taxiway F connects the east end of Runway 8-26 to the Main Taxiway. The Southeast Taxiway accesses the ends of Runways 30 and 26.

The military use taxiways are Taxiways C2, D1, D2, and E, which are connecting taxiways.

The current Airport Layout Plan (ALP), as depicted in the 1994 Airport Master Plan, calls for a number of taxiway

improvements. This plan update will consider those recommendations and assess the status of current capital improvement projects when proposing alternative airport layouts.

Of the 1994 ALP taxiway improvements proposed those remaining to be constructed are the north side parallel taxiway to Runway 8-26 and the connectors A1, B1, and part of the D extension to the proposed development area. Taxiway J is scheduled for realignment per the 2001 Capital Improvement Plan.

These improvements will enhance airfield efficiency by segregating military and civilian activities and accommodating future growth in civilian activities.

Taxiway width is determined by the ADG of the most demanding aircraft to use the taxiway. As mentioned previously, with U.S. Forest Service usage, the most demanding aircraft serving the general aviation area would be the Hercules C 130, within ADG IV. Military requirements would accommodate Class B or an equivalent ADG V rating. According to FAA design standards, the minimum taxiway width for ADG IV is 75 feet. Class B taxiways must also be 75 feet in width. Therefore, future taxiways serving the terminal and/or general aviation areas should be constructed at a minimum width of 75 feet. Future taxiways serving the air cargo area should be constructed at a minimum width of 75 feet. Joint taxiways must be constructed to a 75 foot width, if designed for use by Class B aircraft.

It is recommended that the future parallel taxiway be constructed as part of safety improvements to separate uses of aircraft and to keep civilian aircraft from taxiing across the active runways, when possible. This taxiway should be constructed to ADG IV/Class B standards or 75 feet in width. Should the land acquisition take place extension of future taxiways to access this area should be constructed to the same standards.

NAVIGATIONAL AIDS AND INSTRUMENT APPROACH PROCEDURES

A number of electronic navigational aids are in place to assist pilots in locating and landing at Sierra Vista Municipal Airport/Libby Army Airfield. The Libby VOR (FHU), NDB, and GPS navigational aids assist pilots during the enroute portion of their flight as well as landing to Runway 8-26 during weather conditions when following instrument approach procedures established by the FAA. The Airport Master Plan notes the future relocation of the VOR to collocate with the military TACAN as a VORTAC facility.

The Instrument Landing System (ILS) approach for Runway 26, is a precision approach which has been installed and maintained by Libby Army Airfield. The ILS assists pilots in landing at the airport during poor weather conditions by following instrument approach procedures that provide exact approach path and descent information. The VOR, NDB, and GPS approaches only provide course guidance information. As

stated above, the military side of the airfield also has a TACAN facility for distance measurement for military aircraft.

The advent of Global Positioning System (GPS) technology will ultimately provide the airport with the capability of establishing instrument approaches to other runway ends at minimal cost since there is not a requirement for the installation and maintenance of costly ground-based transmission equipment at the airport. As mentioned in Chapter One, the FAA is proceeding with a program to transition from existing ground-based navigational aids to a satellite-based navigation system utilizing GPS technology. Currently, GPS is certified for enroute guidance and for use with instrument approach procedures. The initial GPS approaches being developed by the FAA provide only course guidance information. It is expected that GPS approaches will also be certified for use in providing descent information for an instrument approach. As mentioned, this capability is currently only available using an Instrument Landing System.

To be eligible for a GPS approach, the airport landing surface must meet specific standards as outlined in Appendix 16 of the FAA Airport Design Advisory Circular, included as an appendix to this chapter. While the airfield is a joint-use facility, military instrument approach standards are not applied to civilian approaches, including GPS approaches. Coordination with and approval of the Libby Army Airfield air traffic controllers is expected to be pursued, given the extent of Restricted

airspace in the near vicinity of the facility.

Presently, only Runway 8-26 fully meets the requirements for a one-half mile visibility GPS approach. The current minimums for the ILS approach are three-quarter mile visibility and 200 feet of ceiling. The remaining runways lack sufficient pavement markings and approach lighting equipment to meet these standards. Runway 12-30 meets non-precision approach standards and the capability for three - quarter mile visibility minimum GPS approaches with 300 foot cloud ceilings. Runway 3-21 meets approach standards and the capability for one mile visibility minimum GPS approaches with 400 foot cloud ceilings.

According to regional weather observations, visual weather conditions (visibility greater than three miles and cloud ceiling greater than 1,000 feet above the ground) occur nearly 99 percent of the time. Therefore, it would appear that it is not necessary to provide instrument approach capability to one-half mile standards at each runway end. Based upon the prevailing weather conditions and the costs associated with installing and maintaining approach lighting equipment, one-half mile visibility approaches should only be planned for each end of Runway 8-26 as this runway currently serves as the primary instrument runway and will be the primary runway supporting scheduled passenger airline operations and can support scheduled cargo operations in the future as well. GPS approaches with visibility minimums of three-fourths mile and one mile should be sufficient

for all other operations to Runways 12-30 and 3-21.

LIGHTING AND MARKING

Currently, there are a number of lighting and pavement marking aids serving pilots and aircraft using the Sierra Vista Municipal Airport. These lighting and marking aids assist pilots in locating the airport during night or poor weather conditions, as well as assist in the ground movement of aircraft.

Runway markings are typically designed according to the type of instrument approach available on the runway. *FAA AC 150/5340-1H, Standards for Airport Markings*, provides the guidance necessary to design an airport's markings.

Runway 8-26 has the necessary precision runway markings for the ILS instrument approach to Runway 26. These markings also support the VOR, NDB, and GPS approaches to the runway. Runway 8 also has precision runway markings that support the GPS approach. Runway 12-30 has nonprecision markings, while visual markings are in place on Runway 3-21. These markings are sufficient for the recommended GPS approaches and should be maintained through the planning period.

Taxiway and apron areas also require marking to assure that aircraft remain on the pavement. Yellow centerline stripes are currently painted on all taxiway and apron surfaces at the airport to provide this guidance to

pilots. Aircraft parking positions are also clearly marked on each apron area. Other than routine maintenance, these markings will not require improvement through the planning period.

Airport lighting systems provide critical guidance to pilots during nighttime and low visibility operations. Runway 8-26 is equipped with high intensity runway edge lighting (HIRL). The other two runways are equipped with medium intensity runway edge lighting (MIRL). These systems are sufficient for the recommended GPS approaches and should be maintained through the planning period.

Effective ground movement of aircraft at night is enhanced by the availability of taxiway lighting. Medium intensity taxiway lighting (MITL) is in place on all civilian taxiways at the airport. These lighting systems are sufficient and should be maintained through the planning period.

The airport is equipped with a rotating beacon to assist pilots in locating the airport at night. The existing rotating beacon is adequate and should be maintained in the future.

In most instances, the landing phase of any flight must be conducted in visual conditions. To provide pilots with visual guidance information during landings to the runway, visual glideslope indicators (VGSI's) are commonly provided at airports. Presently, two types of VGSI's are available at the airport, the visual approach slope indicator (VASI-4) to Runway 8-26 and the precision approach path indicators (PAPI-4) to

each end of Runway 12-30. Facility planning should include installing VGSI facilities for Runway 3-21 and replacement of the VASI-4 system with a PAPI-4. The FAA has recommended that all VASI systems eventually be replaced with PAPI systems.

Approach lighting systems provide the basic means to transition from instrument flight to visual flight for landing on the designated runway. Runway 26 is equipped with a four box Visual Approach Slope Indicator (VASI) system. To attain the one half mile visibility and 200-foot cloud ceiling minimums, a Medium Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR) is needed. To obtain lower minimums for an alternate runway a MALSR, or Omnidirectional Approach Lighting System (ODALS) at the least, should be provided for Runway 12-30. This would be in support of a three-quarters mile visibility and 300-foot ceiling approach minimum.

Runway end identifier lights (REILs) provide rapid and positive identification of the approach end of the runway. While not specifically required for GPS approaches, REILs should be planned for each runway end with an instrument approach procedure and not equipped with a more sophisticated approach lighting system. Presently, only Runway 3-21 is not equipped with REILs. As no instrument approach is associated with this runway, however, REILs are not proposed.

CONCLUSIONS

A summary of the airfield facility requirements is presented on **Exhibit 3B**. The existing runway orientations, lengths, widths, and strengths are sufficient to serve the expected mix of civilian aircraft through the planning period. Taxiways should be constructed as recommended to accommodate a civilian side parallel taxiway to Runway 8-26 and to extend access to the land proposed for acquisition once acquired. Ultimately, the ILS 26 and GPS 8-26 approaches should be established with one-half mile visibility minimums by installation of improved approach lighting (MALSRs). A GPS approach should be established for Runway 12-30 with either three-quarters or one mile visibility minimums. This would also require improved approach lighting, either MALSR or ODALS. These improvements will require formal military approval.

LANDSIDE REQUIREMENTS

Landside facilities are those necessary for handling of aircraft, passengers, and freight while on the ground. These facilities provide the essential interface between the air and ground transportation modes. The landside capacities were examined in relation to projected demand to identify future needs. These have been separated by facility use and type into Commercial Service Facility Requirements and General Aviation Facility Requirements. For the purposes of this master planning effort, discussion is limited to civilian facilities only.

RUNWAYS**AVAILABLE****SHORT-TERM****ULTIMATE****Runway 8-26**

12,000' x 150'

Runway 12-30

5,365' x 100'

Runway 3-21

4,300' x 75'

Runway 8-26

SAME

Runway 12-30

SAME

Runway 3-21

SAME

Runway 8-26

SAME

Runway 12-30

SAME

Runway 3-21

SAME

TAXIWAYS**Runway 8-26**Full Parallel Southside &
Connector G**Runway 12-30**Partial Parallel Taxiway K &
Connectors J and D**Runway 3-21**Partial Parallel Taxiway D &
Connector K**Runway 8-26**

SAME

Runway 12-30

Realign Taxiway J

Runway 3-21

Taxiway D Extension

Runway 8-26

Full Parallel Northside

Runway 12-30

SAME

Runway 3-21

SAME

**NAVIGATIONAL
AIDS**Beacon, ATCT, AWOS,
ASR/PAR**Runway 8-26**ILS, VOR, NDB,
VASI - 4, REILS**Runway 12-30**

PAPI - 4, REILS

Runway 3-21

NONE

SAME

Runway 8-26SAME, PAPI - 4,
GPS, MALSR**Runway 12-30**

SAME, GPS, ODALS

Runway 3-21

PAPI - 2

SAME

Runway 8-26

SAME

Runway 12-30

SAME

Runway 3-21

GPS, REILS

**LIGHTING &
MARKING****Runway 8-26**

HIRL

Runway 12-30

MIRL

Runway 3-21

MIRL

Runway 8-26

SAME

Runway 12-30

SAME

Runway 3-21

SAME

Runway 8-26

SAME

Runway 12-30

SAME

Runway 3-21

SAME



COMMERCIAL SERVICE FACILITY REQUIREMENTS

The components of the terminal area include the terminal apron, gate positions, functional areas inside the building, and automobile parking for the public, airport employees, and rental car companies. An analysis of these areas has been accomplished with the use of FAA Advisory Circular 150/5360-9, *Planning and Design of Airport Terminal Facilities at Nonhub Locations* and Advisory Circular 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities*. These guidelines use forecasted annual enplanements, design hour enplanements, and peak hour passengers to estimate terminal building, apron, and automobile parking facilities requirements over the planning period.

COMMERCIAL SERVICE GATE AND APRON AREA REQUIREMENTS

The number of gates required for enplanement and deplanement of passengers at Sierra Vista and the associated apron areas are determined by demand. The forecasts for the near, intermediate, and long term fleet mix, detailed previously in Chapter Two, Table 2E, indicate that by the end of the short term (year 2005) 50 percent of the passenger fleet mix will be accommodated by both commuter aircraft and regional jet aircraft. The end of the intermediate term (year 2010) mirrors a phasing out of the commuter aircraft in favor of the

regional jet, by a percentage of 75 percent to 25 percent. By 2020 or the end of the long term planning period, the figures indicate that 100 percent of the fleet will be made up of regional jets.

The seating capacities, projected peak enplanements, and apron area requirements for these aircraft are used to determine both terminal gate and apron area needs for Sierra Vista. This is represented by **Table 3G**, Terminal Area Gate and Apron Area Requirements. The table shows that two gates are required through the long term forecast period. The table also indicates the apron area requirements of 6,000 square yards through the long term. Currently there are two gates available at the terminal. The apron area includes 6,000 square yards of apron. Both gate and apron area requirements are adequately addressed by the currently available facilities. However, parking configurations may have to be revised due to a shift to regional jet usage.

The existing terminal configuration was designed in a linear concept to take advantage of the direct access of the passenger flow from gate to curb. This concept is recommended by FAA Advisory Circular 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities*, for airports with under 200,000 annual enplanements. Additionally, the FAA recommends single level functional design of the curb and the terminal building, with apron level aircraft boarding.

COMMERCIAL SERVICE TERMINAL BUILDING REQUIREMENTS

The FAA Advisory Circular 150/5360-9, *Planning and Design of Airport Terminal Facilities at Nonhub Locations* has been used to determine building facilities requirements. According to Advisory Circular 150/5360-9, 6,000 to 8,000 square feet of terminal building space is adequate for nonhub commer-

cial service airports, such as Sierra Vista Municipal Airport.

The relationship of the need for terminal facilities is proportionate to passenger demands. In Chapter Two forecasts indicated increased passenger activity for the near through long term projection periods. Enplanements for the near term are forecast to be 15,500 and grow to 24,900 by the long term, typically a twenty year period.

TABLE 3G Airline Terminal Gate and Apron Area Requirements Sierra Vista Municipal Airport				
		Forecast		
	Available	Short Term	Intermediate Term	Long Term
<i>Peak Hour Passengers</i>	N/A	30	39	49
Commuter Aircraft Gate Positions (<19 seats)	2	2	1	1
Apron Area (Sq. Yds.)	6,000	4,000	2,000	2,000
Regional Aircraft Gate Positions (20-39 seats)	0	0	1	1
Apron Area (Sq. Yds.)			4,000	4,000
Total Gate Positions	2	2	2	2
Total Apron Area (Sq. Yds.)	6,000	4,000	6,000	6,000
Note: N/A Not Applicable				
Source: FAA Advisory Circular 150/5360-9, Planning and Design of Airport Terminal Facilities at Nonhub Locations				

The existing terminal building was constructed in 1982 and expanded in 1992 to a size of 6,983 square feet. Based upon gate usage and peak enplanement, an analysis was performed to determine the gross terminal building space requirements, including: airline ticket and operations areas, gate facility areas, baggage claim, car rental counters, concessions,

public waiting areas, restrooms, and administrative offices.

The results indicate that the current facility meets all requirements for the near and intermediate terms, with exception to administrative space. The analysis indicates that approximately 300-500 square feet are needed to meet short term through long term needs for this area. The other areas that will need

expansion in the future are the concessions and the baggage claim areas. The baggage claim should be expanded ultimately to 800 square feet. Extra baggage waiting area needs can be accommodated by utilizing vacant car rental area into the intermediate planning term. The baggage rack will need lengthening by three feet from seventeen to twenty feet. The concessions area may or may not need expansion, depending on whether vending machines remain the sole form of concession available. Therefore, the terminal substantially meets the planned needs through the intermediate term. Prior to major investment the facilities should again be assessed as to adequacy.

Of greatest importance for the immediate future is to maintain space for any proposed expansion or building additions.

COMMERCIAL SERVICE AUTOMOBILE PARKING REQUIREMENTS

Automobile parking facilities are an important component of the airport and Commercial Air Service requirements. The following **Table 3H**, Airline Terminal Automobile Parking Requirements analyzes parking space needs based on FAA recommendations that use annual enplanements and design day passenger numbers for Sierra Vista. The employee parking needs were calculated to be fifteen percent of the public parking needs. Rental car parking needs were calculated to be between ten for the short term and twenty spaces for the long term needs. Recommended curb areas were calculated from design hour passenger numbers.

TABLE 3H				
Airline Terminal Automobile Parking Requirements				
Sierra Vista Municipal Airport				
	Forecast			
	Available	Short Term	Intermediate Term	Long Term
Annual Enplanements	7,895	15,500	19,800	24,900
<i>Terminal Curb</i>				
Enplane Curb (ft.)	50	27	35	44
Deplane Curb (ft.)	40	32	41	51
Total Curb (ft.)	90	59	75	95
<i>Auto Parking</i>				
Total Public Parking	204	39	50	62
Employee	25	6	7	10
Rental car	20	10	15	20
Total Terminal Parking	249	55	72	92
FAA Advisory Circular 150/5360-9, <i>Planning and Design of Airport Terminal Facilities at Nonhub Locations</i> , April 1980.				

The FAA recommends that fifteen to twenty percent of the total public parking spaces be allotted to short term parking. Short term may include up to three hours of parking. Those spaces nearest the terminal are recommended for this designation. Sierra Vista need not make this restriction until such time as indicated by demand. With high peak hour use, as is consistent with nonhub facilities, the need for this designation could arise within the intermediate time frame, given the potential for two simultaneous airline operations.

As shown in the table, parking needs, including curb drop-off and pickup are expected to be met very adequately through the long term.

COMMERCIAL AIR CARGO REQUIREMENTS

Currently there are no air cargo operations occurring regularly on the civilian side of the airport. However, there has been discussion regarding a move of the U.S. Forest Service fleet of air tankers from the apron on the military side to the civilian side. These tankers are used in fire suppression activities during the peak summer fire season. As many as ten tankers at a time may operate out of Sierra Vista during this time.

The airport has recently been contacted regarding location of a potential aircraft conversion facility to be constructed on the civilian side of the airport. While currently just discussion and not justification for a larger apron facility at this time, it is of note to observe that

there is currently limited space for this type of operation. Neither this conversion facility nor the relocation of the U.S. Forest Service operations would be feasible unless further expansion of the civilian airport can occur.

Currently the only two undeveloped areas on the civilian side of the airfield are: 1) a 360,000 square foot area west of the commercial terminal and parking that is being reserved for terminal/parking expansion and for access to the land proposed for acquisition and 2) a 40,000 square foot area located between the existing hangars. This latter area would be difficult to develop for large aircraft maneuvering due to grade changes and taxiway limitations alongside the adjacent hangars.

GENERAL AVIATION FACILITY REQUIREMENTS

This section will evaluate the space requirements for general aviation hangars, apron, the general aviation terminal building, and automobile parking.

HANGARS

As is true with other airport facilities the need and demand for hangar facilities is dependent upon the number and type of based aircraft. The following analysis of the available general aviation hangar facilities and the forecast needs for these allows a determination of facility requirements.

Utilization of hangar space varies as a function of local climate, security, and owner preferences. The trend in general aviation aircraft, whether single or multi-engine, is in more sophisticated (and consequently more expensive) aircraft. Therefore, many

hangar owners prefer hangar space to outside tiedowns. Taking increasing hangar preferences into account, **Table 3J**, Hangar and Hangar Area Requirements, poses the future hangar needs for Sierra Vista Municipal Airport.

TABLE 3J Hangar and Hangar Area Requirements Sierra Vista Municipal Airport				
	Currently Hangared	Future Requirements		
		Short Term	Intermediate	Long Term
Aircraft to be Hangared	44	58	76	118
Single Hangar Positions	31	36	42	63
Executive/Conventional Hangar Positions	13	22	34	55
Hangar Area Requirements				
Single Hangar Area (s.f.)	38,400	43,000	50,900	76,100
Executive/Conventional Hangar Area (s.f.)	16,900	44,400	67,200	109,200
Total Maintenance Area (s.f.)	0	8,700	11,800	18,500
Total Hangar Area (s.f.)	55,300	96,100	129,900	203,800

Currently aircraft storage and maintenance is being met with a combination of 40 single hangars and one double or executive hangar. The FBO serves dually as a maintenance and storage facility. As stated in Chapter One, these 40 single hangars are separated by use into 32 single and 8 conventional hangars to better determine future needs. Similarly, the double hangar and FBO hangar equate with executive hangar storage capability. The general aviation facilities are located east of the terminal on the civilian side of Sierra Vista Municipal/ Libby Army Airfield.

Characterizing the trend of increasing hangar demand, the number of future

hangared aircraft is based on the current occupancy rate of 81 percent of total based aircraft. Of the future hangared single engine aircraft, 70 percent would be hangared in T-hangars or single hangar facilities, similar to those existing. Ten percent of all other aircraft would utilize single hangars. The total number of single hangars needed for the short, intermediate, and long term planning periods are indicated in **Table 3J**, Hangar and Hangar Area Requirements. Conventional box and executive box hangars are proposed to house the remainder of forecast aircraft to be hangared.

Hangar areas were calculated from the number of hangars required and the areas attributed to each aircraft within that facility. These are also indicated in **Table 3J**. Of the total area requirements, ten percent has been added to allow for maintenance hangar needs. Currently the FBO hangar houses maintenance facilities. This space usage is accounted for in the executive/conventional hangar calculations.

The area required to support these facilities, including an additional ten percent for the future maintenance hangar needs is 96,100 square feet for the short term, 129,900 square feet for the intermediate term, and 203,800 square feet for the long term forecast needs.

Currently there is available space for construction of these facilities through the short term using one of two areas. The area west of the terminal could be developed. However, this would preclude the use of this area for access should the anticipated land transfer from the Army occur. Additionally any future terminal expansion would be limited. The area now reserved for a future FBO could also be used for this purpose. This 40,000 square feet would be enough area for hangar development through the short term. Therefore, forecasted space requirements for hangar facilities would seem to underscore the need for expansion of the civilian airport.


GENERAL AVIATION APRON PARKING

A parking apron should, at minimum, provide for the number of locally-based aircraft that are not stored in hangars, as well as transient aircraft. Approximately 41 tiedown positions are available for transient and based general aviation aircraft at the airport. Of these, 36 are for single and multi engine aircraft and five are for jet aircraft (4 marked, 1 unmarked). The amount of square yards associated with these tiedowns is 29,430 square yards (7 at 700 square yards-designated transient positions plus 29 at 570 square yards-constructed as locally based positions) and 8,000 (5 at 1,600 yards), respectively, for a total 26,230 square yards of available area.

Although the majority of future based aircraft were assumed to be stored in an enclosed hangar, a number of based aircraft will still tiedown outside. The results of this analysis are presented in **Table 3K**, Apron Area Requirements and **Exhibit 3C**, Landside Facility Requirements.


The results indicate that itinerant, jet and locally based aircraft tie down/apron needs are met through the intermediate term. In the long term 4 itinerant positions, 2 jet positions, and 2 locally based positions will be required for an additional 7,200 total square yards.

AIRCRAFT STORAGE HANGARS




	AVAILABLE	SHORT TERM NEED	INTERMEDIATE NEED	LONG TERM NEED
Single Hangar Positions	31	36	42	63
Conventional/Corporate Hangar Positions	13	22	34	55
Single Hangar Area (s.f.)	38,400	43,000	50,900	76,100
Conventional/Corporate Hangar Area (s.f.)	16,900	44,400	67,200	109,200
Maintenance Area (s.f.)	0	8,700	11,800	18,500
Total Hangar Area (s.f.)	55,300	96,100	129,900	203,800

APRON AREA



	AVAILABLE	SHORT TERM NEED	INTERMEDIATE NEED	LONG TERM NEED
Commercial Air Service Gate Positions	2	2	2	2
General Aviation Transient Positions	12	11	15	23
Locally Based Aircraft Positions	29	12	16	24
Total General Aviation Positions	41	3	31	47
Total Commercial Service Apron (s.y.)	6,000	4,000	6,000	6,000
Total General Aviation Apron (s.y.)	29,430	16,200	22,200	34,100

TERMINAL SERVICES AND VEHICLE PARKING



	AVAILABLE	SHORT TERM NEED	INTERMEDIATE NEED	LONG TERM NEED
Comm. Terminal Building Space (s.f.)	6,983	6,000	6,000	8,000
G.A. Terminal Building Space (s.f.)	1,240	1,240	2,500	2,500
Total Comm. Parking Spaces	249	55	72	92
Total General Aviation Parking Spaces	27	47	61	92
Total Comm. Parking Area (s.f.)	150,000	40,000	60,000	100,000
Total General Aviation Parking Area (s.f.)	10,800	18,800	24,200	36,800

TABLE 3K General Aviation Apron Requirements					
	Available	Current Need	Short Term	Intermediate Term	Long Term
Single, Multi-engine Transient Aircraft Positions	7	6	9	12	18
Apron Area (s.y.)	4,900	4,200	6,300	8,400	12,600
Transient Jet Aircraft	5	2	2	3	5
Apron Area (s.y.)	8,000	3,200	3,200	4,800	8,000
Locally-Based Aircraft Positions (not stored)	29	9	12	16	24
Apron Area (s.y.)	16,530	5,100	6,700	9,000	13,500
Total Positions	41	17	23	31	47
Total Apron Area (s.y.)	29,430	12,500	16,200	22,200	34,100

GENERAL AVIATION TERMINAL BUILDING REQUIREMENTS

General aviation terminal building space is required for waiting passengers, the pilot's lounge and flight planning area, concessions, management, storage, and various other needs. This space is not necessarily limited to a single, separate terminal building but also includes the space offered by fixed base operators for these functions and services.

A total of 1,240 square feet of space is provided by the Fixed Based Operator (FBO) at the airport to provide for the general aviation terminal needs. Based on available terminal space and planning standards, the current FBO terminal space is sufficient for existing and short term future passenger levels. Intermediate and long term needs will stimulate increased use and require a larger sized facility equal to approximately 2,500 square feet in the long term.

GENERAL AVIATION AUTOMOBILE PARKING REQUIREMENTS

Among the facilities necessary for smooth general aviation operations is automobile parking for owners of based aircraft and their visitors. The total number of parking spaces is calculated for both the general aviation terminal and the general aviation parking area, typically associated with tie down and hangar areas.

Table 3L, General Aviation Parking Requirements tabulates the number of parking spaces and square footages for those spaces and accompanying maneuvering areas. The area is based upon a factor of 400 square feet per parking space. The number of spaces is determined by the number of based aircraft and the forecasted based aircraft for the short, intermediate, and long terms.

General aviation parking requirements for Sierra Vista Municipal Airport are found in **Table 3L** below. The design hour passengers are assigned one vehicle space each to determine terminal vehicle spaces. The number of based aircraft is assigned a factor of .5 to determine general aviation spaces required. The sum of these two categories defines the number of needed parking spaces and their total areas.

Ten parking spaces, accounting for 4,000 square feet, are set aside for general aviation terminal parking at Sierra Vista Municipal Airport. Eight-

een spaces, accounting for 7,200 square feet, are set aside for the hangar and central tie down facilities. By comparing the requirements in the table, it would appear that the parking needs are not being met. However, the proximity of the commercial terminal parking facility to the hangar areas, along with the excess of parking spaces there, would indicate that general aviation parking needs can be adequately met.

As new hangars are constructed adjacent parking should also be considered to provide a more satisfactory solution to the future needs.

TABLE 3L General Aviation Parking Requirements					
	Available	Current Need	Future Requirements		
			Short Term	Intermediate Term	Long Term
Design Hour Passengers	na	7	11	14	21
Terminal Vehicle Spaces	17	7	11	14	21
Parking Area (s.f.)	6,800	2,800	4,400	5,600	8,400
General Aviation Spaces	10	27	36	47	71
Parking Area (s.f.)	4,000	10,800	14,400	18,600	28,400
Total Parking Spaces	27	34	47	61	92
Total Parking Area (s.f.)	10,800	13,600	18,800	24,200	36,800

The general aviation terminal parking needs may be addressed by adding one new space in the short term, four more in the intermediate term and eleven more for the long term, assuming an added 400 square feet for each space.

The general aviation area parking needs may be addressed by adding, or designating, 18 new spaces in the short term, 29 more in the intermediate term, and 53 more for the long term,

assuming an added 400 square feet for each space.

SUPPORT REQUIREMENTS

These other areas provide certain functions related to the overall operation and safety of the airport and include: aircraft rescue and firefighting, fuel storage, and airport maintenance.

AIRCRAFT RESCUE AND FIREFIGHTING

Requirements for aircraft rescue and firefighting (ARFF) services at an airport are established under **Federal Aviation Regulations (FAR) Part 139**. FAR Part 139 applies to the certification and operation of land airports served by any scheduled or unscheduled passenger operation of an air carrier using aircraft with more than 30 seats. Paragraph 139.315 establishes ARFF index ratings based on the length of the largest aircraft with an average of five or more daily departures. The aircraft currently serving Sierra Vista Municipal/Libby Army Airfield fall within ARFF Index A.

ARFF services at the airport are provided by the military. A change in index rating is not anticipated through the planning period as Regional Jet aircraft (which may provide air carrier service in the future) are within ARFF Index A.

FUEL STORAGE

All aircraft fuel storage facilities at the airport are leased from the city and operated by the Fixed Based Operator (FBO). At Sierra Vista fuel is stored in four above ground tanks with 15,000 gallon storage capacity each for both Jet A fuel and 100LL Avgas. This quantity is sufficient to fuel all aircraft, including the U.S. Forest Service summer peak requirements.

Table 3M summarizes the fuel sales for Sierra Vista from 1995 to the first nine months of 2000 as recorded by the FBO.

Fuel storage requirements are typically based upon a two week fuel supply on hand. With a fuel storage capacity of 30,000 gallons each of Jet A and 110 LL Avgas the storage capacity at Sierra Vista exceeds the current need. The large reserve may, however, be necessary in the event of a spike in fuel use and sales, as may be the case in a high frequency fire summer. It has been estimated that during one four month period in the summer of 1993 the U.S. Forest Service fuel consumption was approximately 64,000 gallons of 110 LL Avgas. Use of two Avgas fuel tanks would allow the requirements of a two week storage reserve to be met.

AIRPORT WASH BAY/ AIRPORT DEICE FACILITY

An aircraft wash facility is located west of the executive box hangars and at the south end of the general aviation parking lot. Recent construction was also completed on a de-ice apron west and adjacent to the large aircraft apron west of the commercial terminal. Requirements for the expansion of these facilities will be dependent upon maintenance needs and users of each facility, but are expected to be adequate for the planning period.

AIRPORT TRAFFIC CONTROL TOWER

Due to heavy military use of the airfield and carefully controlled military use airspace, it is very important for local airspace and airfield operations to be tower controlled. The U.S. Army maintains and operates the Airport Traffic Control Tower (ATCT) facility

located on the south (military) side of the airport. The current hours of operation are from 0700 to 1800 hours seven days a week. There are no

requirements regarding the ATCT for civilian use considerations. The hours of operation of the ATCT is determined by Army needs.

TABLE 3M Annual Fuel Summary Sierra Vista				
	100LL Gal.		Jet A Gal.	
FY	Annual Sales (Gal.)	Monthly Avg.(Gal.)	Annual Sales (Gal.)	Monthly Avg.(Gal.)
1995	93,333	7,778	75,064	6,255
1996	81,849	6,821	48,481	4,040
1997	112,027	9,336	46,101	3,842
1998	124,587	10,382	65,879	5,490
1999	69,026	5,752	111,441	9,287
2000*	66,555	7,395	74,236	8,248
Note: * First nine months of 2000.				

AIRPORT ACCESS

The Sierra Vista Municipal Airport is located just west of State Route 90. Airport Drive is a two lane paved access road that is aligned on the north (civilian) side of the airport extending to the end of the commercial terminal parking lot.

Currently, Airport Drive sufficiently meets the needs of airport users. A separate turn lane for the General Aviation facilities may be required in the intermediate to long term planning period as greater General Aviation use is anticipated. If the acreage north of the road is acquired and developed the future needs for additional lanes to be added to Airport Drive and a second access point to State Route 90 should be considered for the intermediate and long term.

CONCLUSIONS

The majority of the existing landside facilities at Sierra Vista Municipal Airport are able to meet current and forecast demand for the planning period. For Commercial use goals for planning include minor internal improvements through the intermediate term. General Aviation hangar positions and area for hangar construction are among the highest demand improvements for now and the short term. Automobile parking improvements should be coincident with these.

These and other previously noted improvements will be necessary for Airside and Landside facilities and for both commercial and general aviation use. **Exhibit 3B**, Airside Facilities Requirements and **Exhibit 3C**,

Landside Facilities Requirements provide summaries of these requirements.

SUMMARY

The intent of this chapter has been to outline the facilities required to meet

potential aviation demands projected for Sierra Vista Municipal Airport through the planning horizon. The next step is to develop a direction for development to best meet these projected needs. The remainder of the master plan will be devoted to outlining this direction, its schedule, and costs.